Human Body Exploration

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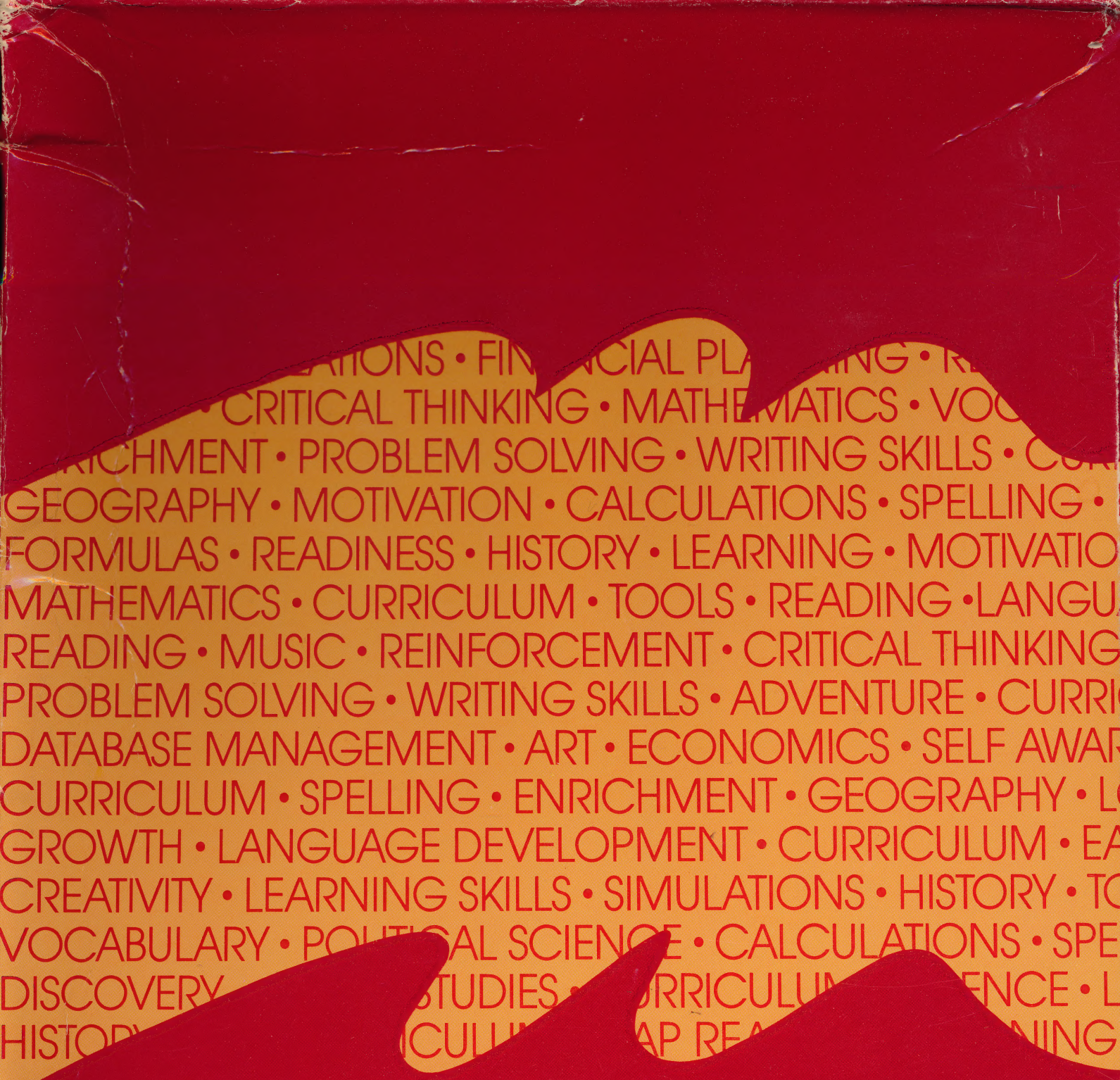
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That's Life:
Explorations and Simulations in Biology

Human Body Exploration

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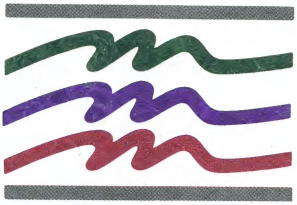

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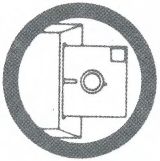

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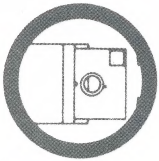

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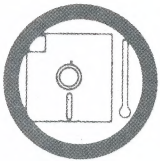

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That's Life:
Explorations and Simulations in Biology

Human Body Exploration

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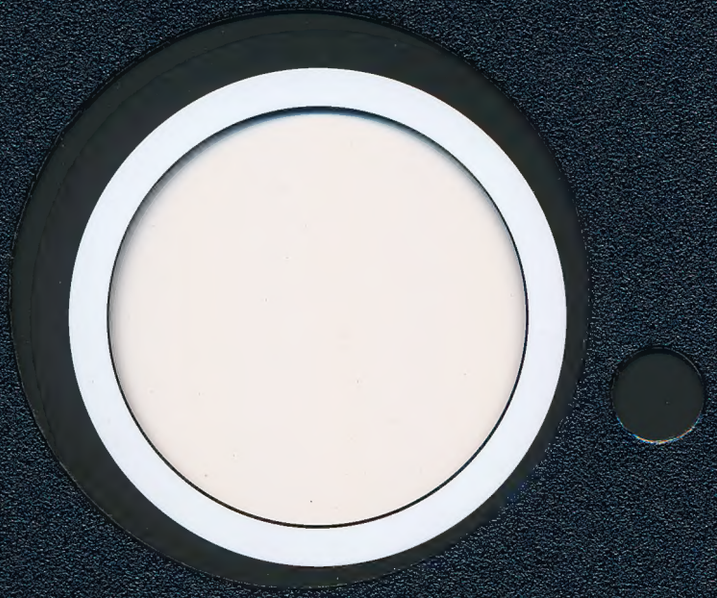

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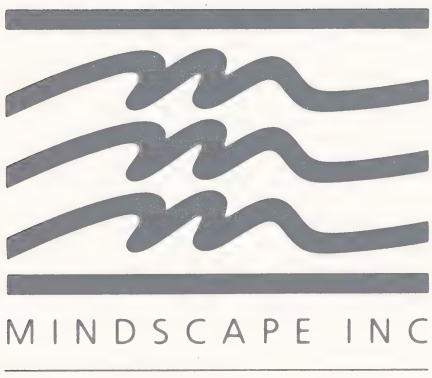
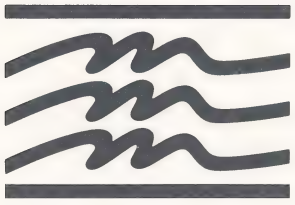


That's Life:
Human Body Exploration

Teacher's Manual

Mindscape School Software

Software that challenges the mind.



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Introduction

This package is part of the Mindscape *That's Life*: *Explorations and Simulations in Biology* Series, a group of powerful, instructional software programs for students in grades 7 through 10. The programs are designed as supplemental activities that reinforce important biological concepts in human physiology, field ecology, genetics, and comparative zoology.

Each double-sided disk contains either an exploration program or a sophisticated simulation. The exploration programs consist of six or seven modules to explore. Within each module, data can be gathered about the structure and function of an organ or an organ system. At the end of each module, several questions verify the learning of key points. The exploration programs have been carefully designed so students can explore one module and answer the related questions within a single class period, approximately fifteen to twenty minutes.

A teacher's management system permits you to take control of the program and begin students in any module. This is particularly helpful when using the program for remediation. In addition, every student's status can be easily saved on the disk and updated after each work session. You can scan a class roster and compare the progress of each student in the class. See the "Classroom Management" section on pp. 9-10 of this manual for additional information.

Program Components

The *Human Body Exploration* package contains a double-sided program disk, a backup disk, and a teacher's manual. The teacher's manual explains how the program works, offers suggestions for classroom use, contains a SpeeDemo section, and includes supplementary activity sheets. The SpeeDemo section provides quick instructions for loading and demonstrating the program to a class.

Structure of the Program

The *Human Body Exploration* contains the following seven modules. Each module corresponds to a specific organ in the human body.

1. Lungs
2. Heart
3. Liver
4. Stomach
5. Kidneys
6. Small Intestine
7. Skin

Within the module for each organ there are five locations where students may gather data. Students choose a location and then select the type of data they want to gather. The data is presented with text and graphics. Students record the data at each location. After exploring all five locations, students enter the question mode. In the question mode, students identify the organ and then use their recorded data to answer two research questions.

Educational Philosophy

The exploratory format of the *Human Body Exploration* is designed to motivate students by making them participants in the research process. The information about each organ is presented as a puzzle for students to solve. As students explore individual locations, they gather pieces of data about the organ. Students must assemble the data to answer the research questions. Students must learn to separate important from unimportant data in order to identify the proper organ.

After identifying the organ, students are asked two research questions. To answer each question correctly, students must consult their log sheets. Students answer each question correctly by identifying the clue that provided the answer to the question. This question-answering procedure emphasizes problem-solving skills and encourages students to reach deductions from available data.

Mindscape Philosophy

Mindscape's Educational Division combines a tradition of educational experience with a dedication to meeting today's demand for new approaches to education. The result is innovative computer software for schools and homes that fully utilizes the computer to make serious learning rewarding for students.

Educational Objectives

Science Objectives

The *Human Body Exploration* will help students

- Identify important organs within the human body
- Identify the structure and function of an organ
- Identify the mechanisms that control an organ
- Associate scientific sampling with internal and microscopic images of an organ
- Deduce answers to questions based on available data

Critical-Thinking Objectives

The *Human Body Exploration* will help students

- Develop scientific research skills
- Develop and practice deductive reasoning skills
- Learn to use observation skills to gather data
- Analyze and separate important data from irrelevant data

Using the Program

Loading

Insert the disk in the drive with the label facing up. Turn on the computer. In a few seconds the title screens will appear. Press the space bar until you come to the Main Menu, or list of activities:

1. Read the instructions.
2. Start a new adventure.
3. Continue an old adventure.

You can select any of the three options on the Main Menu screen or type "T" and RETURN to enter the Teacher Mode. The Teacher Mode allows you to preset the starting point for the learning adventure, see all student records on the disk, or delete student files from the disk. See the "Classroom Management" section for additional information on the Teacher Mode.

If the starting point is not preset in the Teacher Mode, the program automatically starts students at module #1.

Exploring

The first screen within each module displays a graphic of the organ with five numbered locations marked on it. The remainder of the screen is the Adventure Menu. This menu allows students to select a location to explore, enter the question mode, or stop the program.

Students start the exploration process by entering a location number and pressing RETURN. The program proceeds to show a close-up image of the chosen location and the Sampling Menu. Here, students can choose to gather a sample of blood, a sample of the control system, or a sample of the organ's input and output.

Students type the number corresponding to the sample selection they want to see. If it is impossible to obtain that particular sample, the program displays an appropriate message, and students must make another selection. If the sample can be obtained, students have several options from which to make a final choice of analysis:

- Blood input analysis
- Blood input structure
- Blood output analysis
- Blood output structure
- 2 control system analyses
- 2 control system traces
- Organ input analysis
- Organ output analysis

Each option results in either a text or graphic display of data that students must record.

After students have gathered all the available data at each location, they should select the "Questions" option from the Adventure Menu. The question mode starts with a multiple-choice answer selection of the organ that is being explored. Students then proceed to answer two research questions based on the data presented. Each research question has a multiple-choice list of clues with it. Students answer the question by identifying the clue that provided the answer. An incorrect response to any question results in the reappearance of the Adventure Menu so that students may do further exploration. When the program returns to the question mode, students begin with the last incomplete question.

The "Stop" option on the Adventure Menu is used to save students' work for continuation at a later date. When the "Stop" option is selected, the program displays the number of modules that have been completed. Each student's work is listed by the student's name and saved on Side 2 of the disk. When students want to continue their explorations, the program begins where students were when they stopped working.

Classroom Management

Computer Management

The program can keep track of up to 50 students' progress at one time. If the class roster contains the maximum of 50 names, students will be told that the roster is full when they attempt to sign on to start a new adventure. At that point, they are also told to seek help from a teacher. Student records are stored alphabetically by last name on Side 2 of the disk. Each time students begin work on the program, they are asked to type their name. Students can use up to nine characters for their name. Remind students to type their name exactly the same way each time they use the program. If two students have the same name, make sure each student uses a different first initial or abbreviation of the last name. (If two students use exactly the same name, the program will combine their files and treat them as the same student.)

By pressing "T" and RETURN from the Main Menu, you may enter the Teacher Mode, or management system. When the Teacher Mode menu screen appears, you have two options:

1. Set the starting point of a new adventure.
2. Examine the class roster.

If you choose option 1, you will be directed to type the number for the module where students will start. Refer to page 4 of this manual for a complete list of the modules in the program.

If you choose option 2, you will be directed to turn the disk over to Side 2. The program will alphabetize the current class roster and display all student records alphabetically by last name. After each student's name, a series of numbers will note which modules each student has completed. Modules that have been completed are marked by a "1"; modules that have not been completed are marked with a "0."

When the class roster appears on the screen, you may examine or delete student records. To delete a record, enter the name exactly as it appears on the screen. The program will remove the record, re-alphabetize the list, and return to the beginning of the class roster. Student records can only be deleted from within the Teacher Mode. Students cannot accidentally or intentionally delete their files.

Time Allowance

The average amount of time needed to complete a module is about twenty minutes. With the student activity sheets included in this manual, the time can be extended. If students are unable to finish an assignment within a class period, they can use the STOP command to quit working and save their work in the program for continuation at a later time.

Different Computer Arrangements

The *Human Body Exploration* can be used as an effective, instructional package in a classroom with one or thirty computers. Here are some suggestions for different computer arrangements.

Many computers available If your classroom has a large number of computers with one person per machine, then provide each student with a reference sheet and several log sheets on which to record data. The reference sheet and log sheet are included in this manual and may be reproduced.

A few computers available When only a few computers are available, divide the class into small groups of two to four students. Assign a task to each student in the group. For example, each student can explore a single location, and the group can decide what the correct answer is to each question.

One computer available When only a single computer is available, place the machine where it can be easily seen by the whole class. Use the program for demonstration purposes, calling on individual students to select the location to be explored or to answer specific questions. Because of its accuracy and detail, the program can be an excellent stimulus for discussions. You may also want to schedule the demonstrations so that small groups of students can run the program during or after the class period.

Support Materials

Discussion Questions

The following discussion questions are related to the concepts upon which the program is based.

Lungs

- Discuss how the lungs remove dust and dirt so that these particles do not accumulate in the alveoli or bronchioles.
- Discuss the Heimlich maneuver and how it relates to residual air in the lungs.
- Discuss how oxygen and carbon dioxide are carried in the blood and exchanged in the alveoli.

Heart

- Discuss the relationship between the heart muscle and aerobic exercise.
- Discuss the relationship between arteriosclerosis and diet.
- Discuss the relationship between valve closings and the sounds that can be heard through a stethoscope.

Liver

- Discuss how the liver and pancreas regulate blood sugar levels.
- Discuss the relationship between the liver and the intestines.
- Discuss the role of the liver in metabolizing protein and fat.

Stomach

- Discuss how the stomach protects itself from digestive juices.
- List and describe the functions of the enzymes produced by the stomach.
- Discuss some different types of diets and their effects on the body.

Kidneys

- Discuss the relationship between blood pressure and kidney function.
- Discuss how urea and uric acid are formed by the cells in the body.
- Discuss ethical issues surrounding the cost of dialysis and kidney transplants.

Small Intestine

- Discuss how ridges and villi in the small intestine combine to increase the absorption area of the intestine.
- Discuss the function of the lymphatic system.
- Discuss the absorption of fats into the lymphatic system.
- Discuss the role of pancreatic enzymes in digestion.

Skin

- Discuss how evaporative cooling and heat retention function.
- Discuss the relationship between sunlight and skin cancer.
- Discuss the effects on the skin of skin lotions, makeup, and hair preparations.

Research Topics

The following research topics are suggested to ensure students' understanding of the concepts presented in the program.

Lungs

- Research the effects of smoking on the lungs.
- Draw a series of labeled pictures to illustrate a complete cycle of inspiration and expiration.

Heart

- Write a report on artificial hearts.
- Prepare a report on cardiopulmonary resuscitation (CPR).

Liver

- Research the effects of alcohol consumption on the liver.
- Research the gall bladder and the role of bile in digestion.

Stomach

- Learn about stomach ulcers.
- Some vitamins are absorbed in the stomach. Prepare a chart of some of the common vitamins and a listing of the foods in which they can be found.

Kidneys

- Research kidney transplants.
- Draw a picture of a single nephron. Label the parts and describe what happens in each segment of the nephron.

Small Intestine

- Make a list of all the digestive enzymes and their functions.
- Prepare a map of the entire digestive system. Describe the processing or absorption that happens during each step of the digestive process.

Skin

- Research and describe the steps involved in the repair of an incision that ruptures a blood vessel under the skin.
- Prepare a report that explains what happens during tanning.

Student Reference Sheet

Description and Goals

The *Human Body Exploration* lets you explore seven important organs within the human body. The objective of the adventure is to identify which organ you are exploring. Without knowing the name of the organ, you are asked to examine areas within the organ and take samples for analysis. On a log sheet, you must record the information that is supplied at each location in the organ. The record of information will help you to identify the organ and solve two research questions at the end of each investigation. You must answer each question correctly by identifying the clue that provided you with the correct answer.

Getting Started

With the label facing up, insert the disk in the drive. Turn on the computer. In a few seconds the title screens will appear. Press the space bar until you reach the Main Menu, or list of activities:

1. Read the instructions.
2. Start a new adventure.
3. Continue an old adventure.

You can select any of the three options on the Main Menu screen. Select option 2 if you are using the program for the first time. Select option 3 if you wish to continue work that you saved at an earlier time.

If you choose option 2, you will be told to enter your name. After you enter your name and press RETURN, you will be instructed to flip the disk to Side 2 so that the class roster can be checked. Remove the disk from the drive, and reinsert it with Side 2 facing up. Then press the space bar. You will see a message telling you that the roster is full, or you will see a message telling you to flip the disk to Side 1 to begin. If you receive a message telling you that the disk is full, you will need to seek the help of a teacher in order to delete a name from the roster so that your work can be entered and saved.

When the Adventure Menu appears on the screen, half of the screen will display an image of an organ with five locations marked on it. Choose a location to explore by typing the number of the location and pressing RETURN. The Sampling Menu and an image of the location you chose will appear. Choose the type of sampling from which you wish to gather information. When the specific sample screen appears, select the type of analysis for which you want information. The results of the sampling analysis will appear on the screen. Record the information on the log sheet. Continue to gather data for the analyses of all samples in each location.

When you have examined all five locations and the Adventure Menu reappears, type number six to enter the question mode. You will be directed to identify the organ you have been exploring and answer two research questions. If you get the questions wrong, the Adventure Menu will reappear so that you may continue exploring.

If you choose to stop the program, you will be directed to save your work on Side 2 of the disk for continuation at a later time.

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Log Sheet

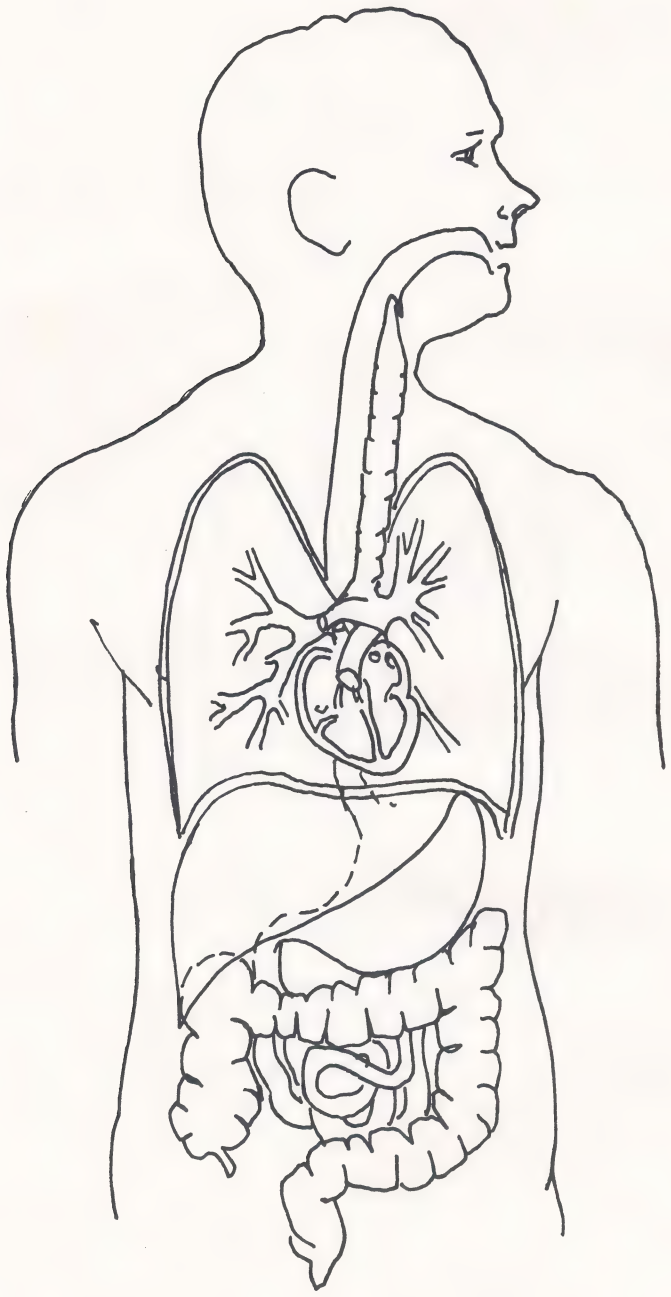
NAME _____

LOCATION #	SAMPLE TYPE	ANALYSIS TYPE	DATA

Activity Sheet 1

On the illustration below, write the number that corresponds to each of the following organs:

1. Lungs
2. Heart
3. Liver
4. Stomach
5. Small Intestine



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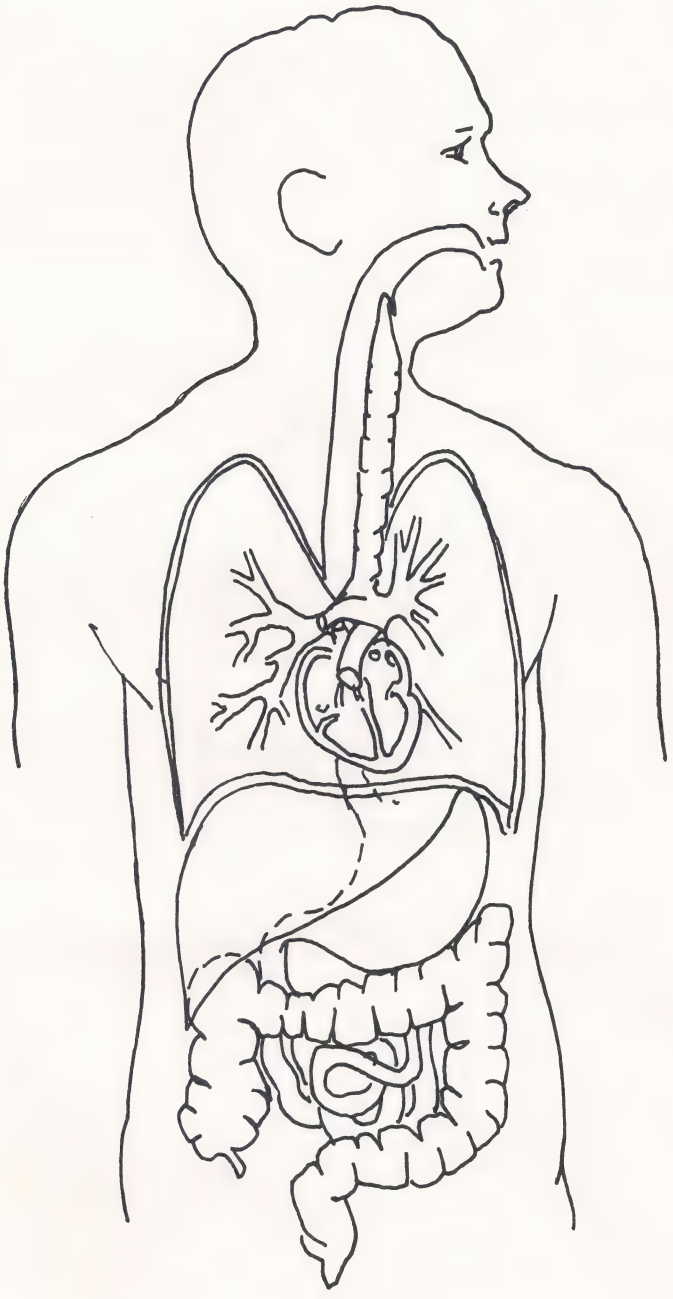
Activity Sheet 2

On the illustration below, write the number that corresponds to each of the following items:

1. Pyloric valve
2. Hepatic lobule
3. Esophagus
4. Aorta
5. Bronchi



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Activity Sheet 3

Create your own mini-adventure. From the following options, select a part of the body and fill in the information about that body part. Draw the body part on a separate sheet of paper.

Options:

Pancreas	Skeletal Muscle
Large Intestine	Brain
Bone	Mouth

Blood input: _____

Blood output: _____

Control system analysis: _____

_____

Organ input: _____

Organ output: _____

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Activity Sheet 4 - Quiz

Answer the following questions:

1. How does ADH affect the nephron tubules?

   _____

2. Enzymes from what three organs enter the small intestine by a duct?

   _____

3. Name two organs that remove waste products from the blood.

   _____

4. In which organ is blood processed by hepatic cells that line a sinusoid?

   _____

5. Which chamber of the heart pumps blood out through the aorta?

   _____

6. What gas is a waste product that is excreted from the body through the lungs?

   _____

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Answers to Questions on Disk

Module 1

1. What organ are you exploring? *Correct answer is 3: Lungs.*
2. Which clue indicates the body protects the lungs from damage from inhaled particles and pollutants? *Correct answer is 4: control analysis location #4.*
3. Which clue indicates that dissolved carbon dioxide is always present in blood plasma? *Correct answer is 2: blood analysis location #2.*

Module 2

1. What organ are you exploring? *Correct answer is 4: Heart.*
2. Which clue indicates that a part of the heart initiates every contraction? *Correct answer is 2: control analysis location #4.*
3. Which clue indicates there is a vein that carries oxygen-rich blood? *Correct answer is 4: organ input.*

Module 3

1. What organ are you exploring? *Correct answer is 5: Liver.*
2. Which clue indicates that the liver helps control blood glucose levels? *Correct answer is 4: control analysis location #4.*
3. Which clue indicates that the liver produces a waste product from protein metabolism? *Correct answer is 1: blood output analysis.*

Module 4

1. What organ are you exploring? *Correct answer is 4: Stomach.*
2. Which clue indicates that some nutrient absorption occurs in the stomach? *Correct answer is 5: blood output.*
3. Which clue indicates that the stomach secretes enzymes which break down proteins and fat? *Correct answer is 3: organ output.*

Module 5

1. What organ are you exploring? *Correct answer is 1: Kidneys.*
2. Which clue indicates that a person's behavior or mood can affect kidney function? *Correct answer is 5: control trace location #4.*
3. Which clue indicates the kidneys are equipped to handle large volumes of blood for filtration? *Correct answer is 1: blood input structure.*

Module 6

1. What organ are you exploring? *Correct answer is 5: Small intestine.*
2. Which clue indicates the small intestine signals itself to produce digestive enzymes? *Correct answer is 4: control analysis location #2.*
3. Which clue indicates that most fats enter the lymphatic system? *Correct answer is 3: blood output structure.*

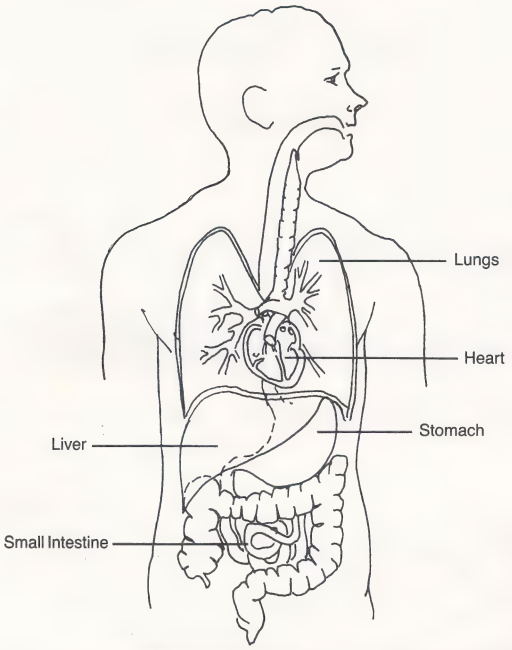
Module 7

1. What organ are you exploring? *Correct answer is 2: Skin.*
2. Which clue indicates this organ provides the brain with detailed information about the external world? *Correct answer is 1: organ input.*
3. Which clue indicates this organ excretes water for cooling purposes? *Correct answer is 5: control trace location #5.*

Answers to Activity Sheet 1

On the illustration below, write the number that corresponds to each of the following organs:

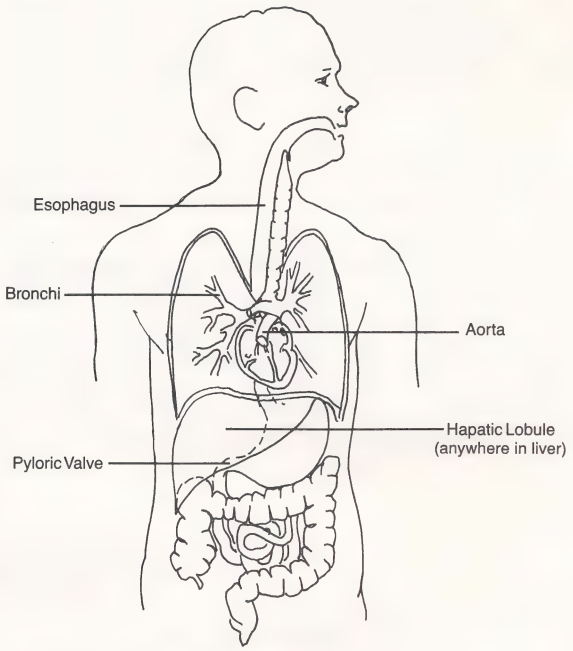
1. Lungs
2. Heart
3. Liver
4. Stomach
5. Small Intestine



Answers to Activity Sheet 2

On the illustration below, write the number that corresponds to each of the following items:

1. Pyloric valve
2. Hepatic lobule
3. Esophagus
4. Aorta
5. Bronchi



Answers to Activity Sheet 3

Create your own mini-adventure. From the following options, select a part of the body and fill in the information about that body part. Draw the body part on a separate sheet of paper.

Options:

Pancreas	Skeletal Muscle
Large Intestine	Brain
Bone	Mouth

Blood input: _____

Blood output: **Answers**

Control system analysis: **will**

_____

Organ input: **vary**

Organ output: _____

Answers to Activity Sheet 4 - Quiz

Answer the following questions:

1. How does ADH affect the nephron tubules?

   ADH controls water absorption from the tubule back into the blood.

2. Enzymes from what three organs enter the small intestine by a duct?

   Pancreas, liver, and gall bladder

3. Name two organs that remove waste products from the blood.

   Kidneys and skin

4. In which organ is blood processed by hepatic cells that line a sinusoid?

   Liver

5. Which chamber of the heart pumps blood out through the aorta?

   Left ventricle

6. What gas is a waste product that is excreted from the body through the lungs?

   Carbon dioxide

SpeeDemo

That's Life: Human Body Exploration

Overview

This package is part of the Mindscape *That's Life: Explorations and Simulations in Biology* Series, a group of powerful, instructional software programs for students in grades 7 through 10. The programs are designed as supplemental activities that reinforce important biological concepts in human physiology, field ecology, genetics, and comparative zoology.

Each double-sided disk contains either an exploration program or a sophisticated simulation. The exploration programs consist of six or seven modules to explore. Within each module, data can be gathered about the structure and function of an organ or an organ system. At the end of each module, several questions verify the learning of key points. The exploration programs have been carefully designed so students can explore one module and answer the related questions within a single class period, approximately fifteen to twenty minutes.

A teacher's management system permits you to take control of the program and begin students in any module. This is particularly helpful when using the program for remediation. In addition, every student's status can be easily saved on the disk and updated after each work session. You can scan a class roster and compare the progress of each student in the class.

To Begin

1. You will need the following:
   - Computer
   - Disk drive
   - Monitor or TV
2. Set up the equipment.
3. Load the program according to the instructions in this teacher's manual or on the reference card, if one is included in the package.

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To Demonstrate

1. When you have loaded the program into the computer, the title screen will appear. Press the space bar until you come to the Main Menu:

    1. Read the instructions.
    2. Start a new adventure.
    3. Continue an old adventure.

    Type "2" and press RETURN to start a new adventure.

2. Type your name. Enter your last name first, then your first initial, and press RETURN. Point out that the program will keep track of your progress using the name you type here. Be sure to enter your name exactly the same way each time you use the program.

3. You will be instructed to flip the disk to Side 2 so that the class roster can be checked. Remove the disk, and reinsert it so that Side 2 is facing up. Press the space bar. You should see a message that tells you to flip the disk to Side 1 to begin. (If you see a message telling you that the roster is full, refer to the "Classroom Management" section of this teacher's manual to learn how to delete student names from the class roster.)

4. Flip the disk to Side 1. The Adventure Menu will now appear on the screen along with a graphic of an organ with five numbered locations. Press "1" to explore location #1. Obtain any samples possible and record all the important data. Notice that if a certain type of sample cannot be obtained, the program will tell you so. Press "4" to exit when you have finished exploring that location. This will return you to the Adventure Menu.

5. Press "6" to enter the question mode. The first question that appears asks you to identify the organ you have been exploring. Press the number that corresponds to the correct organ and press the Return key.

6. After you have correctly identified the organ, another question will appear. Press ESC to return to the Adventure Menu.

7. You can stop working and save your progress at any time by pressing "7" to stop the program. Follow the on-screen instructions to remove the disk from the drive, flip it, and then reinsert it with Side 2 facing up. A message will appear confirming that your progress has been saved. If you save your work, you will start where you left off when you use the program the next time. If you don't save your work, you will start with the first organ again the next time you use the program.

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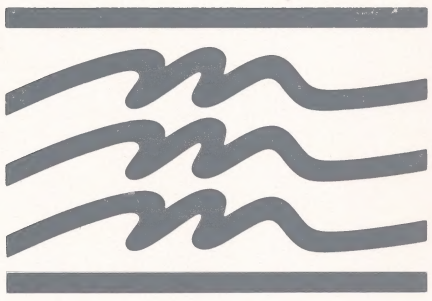
Diskette Replacement Policy

For 9 months following the 90-day limited warranty period, you can replace defective diskettes at a cost of $10.00 per diskette. To replace a diskette:

- Enclose the defective diskette with a brief explanation of the problem
- Enclose a check or school purchase order for $10.00
- Send in protective packaging to:

Mindscape Educational Division Customer Service
Mindscape, Inc.
3444 Dundee Rd.
Northbrook, Illinois 60062



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